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**NEW YORK ZOOLOGICAL SOCIETY
SEVENTY-FOURTH ANNUAL REPORT
1969**

**NEW YORK ZOOLOGICAL SOCIETY, THE ZOOLOGICAL PARK
BRONX, NEW YORK 10460**



THE REPORT OF THE PRESIDENT

This publication is a report to the members on the stewardship of the society for the year, on how the collections and the research facilities are carrying out our threefold mission — education, conservation, and research.

It is a report tempered with sadness in the knowledge that Fairfield Osborn, our president for twenty-eight years, is no longer with us. His death on September 16, 1969, was a loss to each of us personally as well as to our society.

However, his dedication, his foresight, and the fruits of his leadership live on as an example and an inspiration for us all. We are profoundly grateful that he raised his voice in a prophetic cry of concern for the environment which is only now beginning to be fully appreciated by the people of this country.

Dr. Osborn warned that by over-populating the earth, leveling the forests, polluting the waters, and corrupting the air, man threatens to make himself an endangered species. His philosophy, however, was not a utopian vision or return to some primal Eden. Dr. Osborn was a practical visionary who recognized that twentieth century technology could — and must — work in harmony with nature. He called for a new way of looking at the world, a re-ordering of values based on a reverence for all life. Toward this end, he dedicated his years with the society.

At this start of a new decade, it is particularly appropriate that we reflect upon the society's responsibilities for the seventies.

The seventies are a crucial decade for the objectives of the society. America, and indeed the world, is finally coming to realize that we cannot go on despoiling the land, the air, and the water on which all life depends. We are also learning that man needs the beauty of nature as a primary source of enjoyment and inspiration.

From the campus to the White House, there is a new awareness that a good environment is crucial to the quality of life and that the time for action is upon us.

The establishment of the Council on Environmental Quality is further dramatic evidence that environmental concern is becoming important at the highest levels of government. Under Secretary of the Interior, Russell Train, formerly president of the Conservation Foundation, will chair this group as the President's principal advisor and coordinator.



FAIRFIELD OSBORN

For the better part of a century, from the fight to save the bison in the United States to the protection of parks in Africa, our society has been concerned with a favorable environment for man and other animals. Long have we known, whether at the zoo or on the plains of Africa, that the dangers of over-grazing and over-population are a primary threat to environment and individual and group survival. This lesson of nature is just beginning to be generally recognized as a major threat to the quality of our lives as well as to our natural environment.

Today, more than ever, a special responsibility falls upon us. The public is turning to us who have been concerned with environmental quality over the years for leadership and guidance. Our society has a unique and special role to play in the seventies, and our contributions will be widespread and diverse.

The society is a broadly-based, urban institution which has basic knowledge about relationships of animals to their environment and the responsibility to share it.

Through our laboratories and research, we are making further major scientific contributions to the understanding man must have of the world

about him. Through the Bronx Zoo and New York Aquarium, we contribute significantly to the educational needs of youth and people in general.

Some of the work of the Osborn Laboratories of Marine Sciences in oceanography, for instance, is yielding important findings on population and food supply. Our joint efforts with the Rockefeller University at the Institute for Research in Animal Behavior are producing a fertile cross-pollination of knowledge. The society's research on animal behavior is helping to provide new insights into the university's studies of human biology.

Our zoo-aquarium complex provides an essential respite from the turmoil of urban living. These elements combine to provide recreation and education and give people insights into nature. They offer an opportunity to know that by allying himself with nature — instead of ignoring or despoiling it — man may become aware of facts and values that are basic to his spiritual fulfillment and peace of mind.

I believe that no other institution can help man place himself in perspective so well, or provide so much enjoyment to so many people. This is evidenced by the attendance figures showing that more than 100,000,000 people go to zoos each year, more than to all national football and baseball games combined.

The society took a major step last year toward providing a stronger financial base by changing the entrance fee structure. Until 1969, our legislative charter required that admission be free on the weekends and holidays when it was crowded — often overcrowded.

We went to the State Legislature and asked that this policy be changed. They, as we, were concerned about continued free admission for those who cannot afford to pay. We believe that adequate steps have been taken to provide for this need.

There are now three free days each week, and school children and other New York City educational groups still enter without charge at any time. Under the revised law, income from fees will become an increasingly significant factor in overcoming our growing operating deficit, which has been progressively threatening to curtail our service to the public.

During the past year, the society was again influential in helping to bring about sound public conservation policy. Members of the staff were active in the drafting, and the society helped provide scientific information for the passage of the Endangered Species Act which the President signed into law this year. It now becomes illegal to import the skins of endangered species into this country, which will be a major factor in protecting them.

On the local scene, the society provided information for the development of an ordinance, signed by Mayor John V. Lindsay, which prohibits trade in domestic alligator hides in New York City. As New York is a principal market for alligator skins, poaching alligators now should be much less profitable.

Our board was further strengthened at its June meeting by the election of Gilbert Grosvenor, Vice President and Associate Editor of *The National Geographic*. Mr. Grosvenor has long been involved in the work of the society, and he brings to it not only his interest, but his unique talent and experience as well.

A most significant and dramatic event took place at the December meeting when the Board of Trustees, for the first time in the society's history, unanimously elected two women as members — Mrs. Lila Acheson Wallace and Mrs. Vincent Astor. These two ladies bring to our board not only remarkable perception and charm, but they also bring great imagination, dedication, and most certainly extraordinary generosity — for all of which we are most extremely grateful.

Mrs. Wallace is a distinguished publisher and a philanthropist. Her interest has been one of the great strengths of the conservation and historic preservation movements. Over the past several years, Mrs. Wallace has made available gifts to the society totaling \$3 million in order to make possible a new approach to our display of birds.

The World of Birds, now being built with these funds, will give the visitor a new feeling for the excitement of the earth's 8,600 species of birds and a new understanding of his own relationship with their world. There will be no wire-mesh, no conventional cages. Our guests, so to speak, will be perched on a human roost in the treetops while the birds swoop about them. There, people can study and enjoy the life of birds under the best of circumstances. There will also be a small art gallery and a wildlife theater to enhance the educational value of this exhibit.

Mrs. Astor is our other new board member. Her long and active interest in animals has only been exceeded by her love and concern for people. Her role as a leader of innovative programs for disadvantaged youth in this city is a story of outstanding citizenship.

A grant from the Vincent Astor Foundation, of which Mrs. Astor is president, made possible the unique World of Darkness which opened this year. It has already brought pleasure and knowledge to many thousands of people.

The Astor Foundation is making a remarkable further pledge to the society. The Foundation will grant up to \$5 million for the construction of a most dramatic and fascinating Tropical Asia exhibit.

No area in the world has a more exciting wildlife or is under greater pressure from environmental destruction than this exciting area which stretches from the Arabian Peninsula to Java. At the new Astor exhibit, the visitor will walk into and become a part of tropical Asia. Moving from dense jungle to open plain, he will come upon tapirs and tigers, elephants and rhinos, and the many other exotic animals of that region. Each animal will be in an environment approaching its natural one.

There will also be special interpretive exhibits and guided tours. There will be a theater to interpret the relationship of man to his environment not only in tropical Asia but in New York as well.

This new thirty-acre resource will not only enrich our display, but it will add significantly to our capacity to handle visitors. It will also provide new facilities for breeding endangered animals. All this, of course, will be expensive. The total cost is estimated to be in the neighborhood of \$10 million.

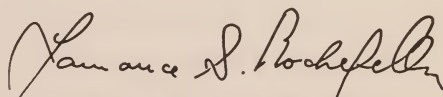
The Astor Foundation's extraordinarily generous gift gets us well on the way. A major part of the remaining cost involves roads and a bridge and basic utilities. We hope that the society's long-time, loyal, and generous partner — the City of New York — will participate substantially in providing these basic additional capital requirements.

Our two distinguished new trustees, Mrs. Wallace and Mrs. Astor, have challenged us with the two most generous and significant grants in the history of the New York Zoological Society. Words fail to thank them adequately. We can best show our appreciation by the inspiration we receive from them in rededicating ourselves to the further fulfillment and development of our goals as a society.

The magnitude and the need is great, and in order to fulfill these challenges, we shall have to seek and to find additional sources of support. I hope that new individuals and new foundations will join with our old friends in the coming years. I also hope and expect, that in time, we may find state and federal agencies taking a role in the support of institutions such as ours.

In conclusion, let us always remember that man cannot live and does not live by bread alone. Man needs a means of knowing that there is something of importance and meaning beyond himself. Nature and animals are a primary source of providing such experience.

In essence, the key role of the society is to provide urban man with the enjoyment, knowledge, and inspiration that comes from contact with and understanding of nature. Your continued interest and enthusiastic support is now needed more than ever. It is most certainly appreciated.



LAURANCE S. ROCKEFELLER



REPORT OF THE GENERAL DIRECTOR

The concluding year of the 1960's found the New York Zoological Society at a new point in its evolution. Its educational animal exhibits in New York City and its broadly-based, far-flung research efforts have blended to make the society a unique center for environmental education and science. The great collections of living wild creatures at the zoo and the aquarium now are combined with the major research facilities of the Osborn Laboratories of Marine Sciences, the Institute for Research in Animal Behavior, and the William Beebe Tropical Research Station in Trinidad. At the same time the society continues to sponsor many independent research and conservation efforts. Thus the New York Zoological Society now forms a complex that offers meaningful environmental education, rewarding recreation, and significant contributions in basic research and conservation in a way particularly appropriate for our time.

During 1969, the society's basic institutions, the zoo and aquarium, underwent penetrating scrutiny. The basic plant of each was assessed and their future projected in a series of master-planning efforts. Staff and trustees met throughout the year with architects and consultants as future needs and responsibilities were outlined and plans were calculated to meet them.

In all of this planning the society's relationship with the Parks, Recreation, and Cultural Affairs Administration of the City of New York has been exceptionally close. It has developed into a collaboration which promises to make many of the society's efforts more broadly based. Discussions with the Administration have also resulted in collaborative projects with the Central Park Zoo. Serious study is being devoted to the possibility of the society operating this and other city zoos for the Administration. However, the Bronx Zoo and New York Aquarium, unlike some of the city's other cultural institutions, are much more than community resources. They are regional, even international, in their responsibilities.

Population Statistics

At the same time, the society's plans must take into cognizance the basic statistics of the New York area, the decreasing average age (now about 27 years) of Americans in general, the need for participatory programs, for relevance to immediate and to local concerns, and also for changing displays (an especially difficult task when the welfare of living exhibits is affected). In all projections for development, the eventual capacities of the zoo and aquarium must be calculated, as must problems of circulation, of

access and exit, and of the protection and safety of the visitors from the collections and the collections from the visitors. Animal exhibit problems are unique.

The daily summertime capacity of the Bronx Zoo for adequate operation is now about 30,000 visitors. Nevertheless, days with 50,000 and even 60,000 visitors were recorded during 1969. Happily both the zoo and the aquarium have room for substantial expansion (although a need for further expansion of the aquarium site is probably inevitable). Preliminary studies suggest that the zoo may be arranged to accomodate well over 100,000 visitors in a day and that the aquarium may also be developed to house several times its present attendance. Future plans provide for evening attendance at the zoo as well as the aquarium. In brief, the society's basic institutions have a most unusual built-in capacity to grow.

Meanwhile, however, man's population is now thought to be increasing 190,000 every 24 hours, 70 million a year. The United States increase is 48,000 people each week and the parents of 20 years from now have already been born.

The zoo and aquarium are naturally affected more directly by the modern problems of human overpopulation and habitat destruction than are most institutions. And this is as it must be for institutions directly concerned with environmental education. For example, many native birds exhibited at the Bronx Zoo in years gone by never again will be seen here. These include the passenger pigeon, Carolina parakeet, whooping crane, California condor, and probably the peregrine falcon. Although brown pelicans have been represented in the collection almost from the zoo's opening day, it seems clear that this superb bird is on the way to extinction or near-extinction. Its last populations on the Gulf coast are gone and those in California are rapidly succumbing to the effects of DDT. For the immediate future, only a few colonies in Florida seem viable. Indeed, I see no reason for optimism about the future of any of the larger waterbirds near areas where pesticides are regularly used. It is tragic to think that some of the species which have been lost could have been perpetuated in zoos, had their status been understood, and perhaps repatriated to parks as was the American bison.

The Plight of Endangered Species

Increasingly, zoos are becoming repositories for extinct and vanishing species. Increasingly, the great "zoo favorites" are disappearing from their native lands and, in many cases, their decimation must be laid at the door of the powerful American consumer. Although less than 3,000 tigers and 600 snow leopards remain alive in the wild today, both species are still being destroyed for their fur — most of which goes to the United States market. During 1968 and 1969, for instance, 3,168 raw cheetah skins were imported by United States furriers; so were 17,490 leopard skins, 23,347 jaguar skins, and 262,030 ocelot skins. More than 51,000 otters were killed in 1969 alone for the American skin market. However, these figures do not begin to indicate the number of animals killed for foreign furriers who feed the United States consumer with finished hide products.

Moreover, the United States pet and laboratory trades in living animals have not declined. 1969 imports nearly doubled those for 1968. When we add to this the effect of the almost unimaginable expansion and destruction of habitat that human population increase indicates, the plight of many wild creatures can be seen to be desperate. This makes the role of zoos and aquariums unique.

Zoos must exhibit fewer species and display those species they do exhibit in greater numbers and more meaningfully. Wherever practicable they must breed their animals on a long-term basis. Toward this end, significant changes in our collections have been effected during the past year. The zoo's bird and reptile collections have been reduced in number of species. Programs to exhibit those species which have especially important stories to tell, or which require captive propagation, have been increased. Similar programs are underway with herd animals in the mammal department. Nevertheless, it is clear that it is a necessity and an obligation to establish a substantial farm or "Wildlife Survival Center," outside New York City, for larger breeding herds of endangered species. Several potential sites were investigated by trustees and staff during the year but a proper location has not been found. It is anticipated that the center would be established on a self-supporting basis through public admission charges and that it would become a

site for research as well as for breeding and exhibition of rare species.

The Role of Zoos in Education

While the primary educational techniques of the zoo and aquarium are not those of the classroom, collaboration with school authorities in 1969 reached new importance. Major programs in cooperation with city public schools were carried on, but these new programs have only touched upon the potential for zoo and aquarium contributions to formal education.

It is evident, from the requests we have received, that the society must offer regular summer and night courses as well as special week-end lectures and natural history programs at the zoo and aquarium. Both institutions suffer from inadequate classroom and auditorium facilities and small educational staffs. Both, however, also have major undeveloped resources in addition to their collections. At the zoo, natural ponds and rivers, and at the aquarium the daily largesse of the bio-flotsam cast up by each day's high-tide, present special opportunities for immediate and continuing field-study programs in local ecology. The animal exhibits, at the same time, offer a rare resource for educators.

The World of Darkness and the World of Birds

The opening of the World of Darkness exhibits building on June 12 pioneered a new sophistication in exhibition of wild animals. The building was made possible by a gift to the society from the Vincent Astor Foundation and by appropriations from the Capital Budget of the City of New York. The new structure reveals the activities of a broad spectrum of night-active animals in an extraordinary series of simulated habitats. The building's design and development are the result of an unusual blend of architectural sensitivity, from the architectural firm of Morris Ketchum and Associates, and animal exhibit know-how from the society's own staff.

As the doors of the World of Darkness opened to thousands of visitors, construction began upon the World of Birds. This \$3.5-million structure is the most ambitious zoo exhibit ever attempted by the society and has been made possible by the generosity of Mrs. Lila Acheson Wallace, for whom it will be named.

Physical Improvements

During the year, a number of more modest improvements also were accomplished or initi-

ated at the aquarium and the zoo. Early in October, the society's unused boardwalk buildings at the aquarium were renovated to provide sorely-needed administrative offices and a new hall for exhibits and lectures. An especially-successful cold-water exhibit featuring stone-crabs, octopi, and sea anemones was installed between the Polar Bay exhibit and main hall. The electric eel display was remodeled to exhibit an unusual collection of many electric fishes, and the aquarium's main hall was air-conditioned.

At the zoo, work began upon a renovation of the great apes house to provide more adequate breeding facilities for the increasingly rare orangutan and gorilla, and to provide a matrix for the first zoo attempts at habitat settings for the two species. Remodeling of the building for reptiles and amphibians by Architect Harmon H. Goldstone was substantially completed during the year. Collaboration of the Department of Exhibition and Graphic Arts and the Department of Herpetology resulted not only in new exhibit standards (including built-in cloudburst with lightning and thunder in one exhibit) but also a one-way circulation pattern. Work continued elsewhere in the zoo upon the renovation of the old kangaroo house and adjoining paddocks and upon the eagles and vultures aviary.

Although the society has long had the finest collection of references in a Western Hemisphere zoo, the lack of a librarian has rendered this library almost useless. The scientific staff has found it necessary to make extensive use of other libraries because many of the zoo's unique references have been unavailable. A gift from the Robert G. Goelet Foundation has made possible the establishment of a proper library and this project is underway.

Finances

Despite the picture of vigor and development provided by the summary above and by the detailed departmental reports which follow, the society's operating budget became ever more precariously unbalanced during the year. Increasingly, the City has found that its great burdens make it difficult if not impossible to live up to the spirit of its long-term support relationship to the zoo and aquarium. A serious decline in expected City support occurred during 1969. Coupled with this decrease in support, rising costs in every area of society endeavor resulted in

a deficit in annual operating income of more than one-quarter million dollars even though the years brought the largest donations and pledges for capital improvements in the society's history. Faced with these realities, the society (as it has since 1961) again sought and this year finally received permission to raise its admission fees at the zoo and aquarium and to charge admission to the zoo on four days, including Sunday, each week. Previously admission was charged on three days each week. The zoo's admission fee had been 25 cents since 1899, except for a brief period during the depression.

The effect on attendance of the admissions changes, initiated on July 5, could not be detected readily. Zoo attendance is traditionally more dependent upon weather than upon fees; the first full month of operation with the new fees brought attendance seven percent higher than the ten-year average. Attendance for the year was below average for both zoo and aquarium.

Attendance, 1969:

New York Zoological Park 2,335,693

New York Aquarium 475,111

The new fees combined with rising costs made a reassessment of membership expenses inevitable. Although the number of members has steadily increased, membership's contribution towards annual operating costs remains minor. A first revision was instituted at the end of 1969, and it is planned to make the approach to membership classes and privileges more elastic and responsive to need in the future. Although new classes of membership were instituted, the basic membership was raised from \$15 to \$25.

Additional Activities

During October, the society hosted the 24th Annual Conference of the International Union of Directors of Zoological Gardens. Distinguished zoo professionals from all over the world gathered at the zoo and aquarium to discuss trends and plans in development of zoological parks and aquariums.

Personnel

The society's daily operation as well as its long-term future are dependent upon its staffing. Important staff changes occurred during the year.

In November, Institute of Research in Animal

Behavior Director Donald R. Griffin, whose efforts contributed so crucially to the genesis of the institute, stepped down in order to devote more time to his research. He will continue as a senior research zoologist at the institute. Senior Research Zoologist Peter R. Marler assumed the directorship and Richard L. Penney was appointed assistant director.

Comptroller Walter Lerchenfeld was elected assistant treasurer of the society, to take office in 1970, and Mr. Anthony DeSiena became accounting manager. Mammalogist James G. Doherty was appointed assistant curator of mammalogy, and Ornithologist Donald F. Bruning became assistant curator of ornithology. Mr. Robert A. Brown transferred from the Institute for Research in Animal Behavior to become assistant curator of the animal departments. Miss Joan Van Haasteren became associate editor, and Miss Mary G. Watmore was appointed animal trainer at the aquarium. Dr. Charles P. Gandal, the zoological park's long-time veterinarian, resigned to enter private practice, and this important vacancy was filled by the appointment of Dr. Emil Dolensek who will take up residence in 1970. Mr. Edward Kearney, successful manager of the zoo's large facilities operation, retired on September 1 and was replaced by the appointment of Mr. Alden Johns.

The death of General Curator Emeritus Lee S. Crandall on June 25 deprived the society of the most distinguished zoo curator in its history. To zoo professionals, the Bronx Zoo and Lee Crandall were synonymous. Mr. Crandall, during his years with the society, saw the Bronx Zoo develop into a world-renowned cultural and scientific institution. In a time when the zoo was beginning its evolution into a center of environmental education, Mr. Crandall was a link with the youth of our institution and a reminder that its new directions are based on a solid foundation. His incomparable experience, considerate counsel, and human warmth are deeply missed.



WILLIAM G. CONWAY



THE LIVING COLLECTION

The New York Zoological Park (Bronx Zoo)

Mention the Bronx Zoo and many pleasant images spring to mind: laughing children dressed in their best, a leisurely stroll on a quiet weekday afternoon, a red balloon floating skyward, an outing on a summer Sunday, a tractor-train ride. The Bronx Zoo can mean many things, depending on who you are, how old you are, and your outlook on life. To just about everyone, however, the zoo means one thing most of all — live wild animals. Our collection of living creatures from all over the globe is the heart of the zoo, and in reality, what the zoo is all about.

Seeing these animals, especially in exhibits that simulate their natural environments, can stimulate a true appreciation for the creatures that share this planet with man. Every effort is made to breed the zoo's wild animals, particularly those that are rare. The Bronx Zoo cooperates with other zoos in wildlife breeding programs and several of our animals have been bred to specimens from other zoos in hopes of propagating threatened species.

The Departments of Mammalogy, Ornithology, and Herpetology share the responsibility of caring for and exhibiting the zoo's collection of more than 3,000 animals.

DEPARTMENT OF MAMMALOGY

Hugh B. House, *Curator*

Grace Davall, *Assistant Curator*

James G. Doherty, *Assistant Curator*

Robert Brown, *Assistant Curator*

Joseph Ruf, *Animal Manager*

Mario Rolla, *Assistant Animal Manager*

Robert Montana, *Assistant Animal Manager*

People may gape at a giant python, or marvel at the exquisite beauty of a hummingbird, but often it takes a mammal — elephant or monkey, chubby raccoon or cute tiger cub — to evoke that special warmth. Probably it's because man is a mammal, too, but whatever the reason, it is likely that mammals dominate the list of favorite animals of most zoo visitors.

During 1969, there were 988 mammals of 199 species and subspecies in the collection. This was an increase of more than a hundred specimens from the previous year, and it resulted largely from the addition of bats to the new World of Darkness. Most of the bats were collected by

members of the mammal department in the American tropics. Curator Hugh B. House collected fishing bats in Brazil, and several species were collected by Assistant Curator James G. Doherty at the society's William Beebe Tropical Research Station, Trinidad, W. I.

New species of bats added during the year were:
 tailless long-tongued bat, *Anoura geoffroyi*
 lesser long-tongued bat, *Glossophaga soricina*
 yellow-shouldered bat, *Vampurops lineatus*
 Mexican fruit bat, *Artibeus jamaicensis*
 Mexican free-tailed bat, *Tadarida brasiliensis*

The mammal department's breeding program resulted in the births of 174 specimens of 53 species during the year. Among the notable births were those of mouse deer, four species of bats, Grevy's zebra, wisent, dik-dik, Siberian tiger, and Bahama hutia.

The zoo's breeding male snow leopard, Bowser II, the sire of cubs at several United States zoos, was bred to females from the Milwaukee and Oklahoma City zoos.

The responsibilities of the Department of Mammalogy increased measurably when the new World of Darkness was placed in its charge. Experimentation with new exhibit techniques and new animals did not cease with the opening

of the building, but continued for several months. Careful study and observation showed that some animals adapted far better to certain exhibits than others. It was also found that additional species could be added to some exhibits. Pottos and thick-tailed galagos, for instance, were added to a forest exhibit containing duikers and brush-tailed porcupines, to give the exhibit more meaning and interest.

CENSUS OF MAMMALS
 December 31, 1969

| Orders | Families | | Specimens |
|---|-----------------------|-----|-----------|
| | Specis and Subspecies | | |
| MARSUPIALIA | | | |
| kangaroos, phalangers, opossums, etc. | 2 | 5 | 13 |
| INSECTIVORA | | | |
| moles, shrews, hedgehogs, etc. | 2 | 3 | 8 |
| CHIROPTERA | | | |
| bats | 5 | 15 | 177 |
| PRIMATES | | | |
| apes, monkeys, lemurs, marmosets, etc. | 7 | 33 | 123 |
| EDENTATA | | | |
| armadillos, sloths, anteaters | 3 | 5 | 10 |
| LAGOMORPHA | | | |
| pikas, rabbits, hares | 1 | 1 | 2 |
| RODENTIA | | | |
| squirrels, beavers, mice, porcupines, etc. | 14 | 32 | 118 |
| CARNIVORA | | | |
| bears, raccoons, cats, dogs, otters, etc. | 7 | 54 | 162 |
| PINNIPEDIA | | | |
| seals, sea lions, walruses | 2 | 2 | 5 |
| TUBULIDENTATA | | | |
| aardvarks | 1 | 2 | 3 |
| PROBOSCIDEA | | | |
| elephants | 1 | 3 | 4 |
| HYRACOIDEA | | | |
| hyrax | 1 | 2 | 4 |
| PERISSODACTYLA | | | |
| horses, tapirs, rhinoceroses | 2 | 4 | 13 |
| ARTIODACTYLA | | | |
| cattle, sheep, antelopes, camels, giraffes, deer, swine, hippopotamuses ... | 6 | 38 | 346 |
| Totals | 54 | 199 | 988 |
| Summary: orders, 14; families, 54; species and subspecies, 199; specimens 988 | | | |



DEPARTMENT OF ORNITHOLOGY

William G. Conway, *Curator*

Joseph Bell, *Associate Curator*

Grace Davall, *Assistant Curator*

Donald Bruning, *Assistant Curator*

Robert Brown, *Assistant Curator*

Andrew Winnegar, *Animal Manager*

Eric Edler, *Assistant Animal Manager*

Man may feel a special kinship with the mammals, but it is the birds, with their beauty and grace, that so often capture his imagination. To look at a bird winging into the sun is to feel a certain longing or even a touch of awe. The Department of Ornithology strives to bring the particular fascination of bird life to the zoo visitor. One can spend an entire day — indeed, several days — visiting only the zoo's bird collection.

Construction of the World of Birds, which will be one of the most spectacular of all zoo buildings, began during the year. In anticipation of the eventual transfer of specimens from the old Large Bird House to the World of Birds, new accessions, particularly of smaller tropical passerines, were kept to a minimum during 1969. The waterfowl collection was somewhat reduced in number in keeping with a planned program to maintain larger, breeding flocks of fewer species. Nearly 40 waterfowl of 17 species were disposed of by exchange in a move toward achieving this goal.

However, the collection was enhanced during 1969 by the addition of 24 species, including two pairs of Malayan peacock pheasants, a species never before exhibited at the zoo. The peacock pheasants were housed in the Pheasant Aviary, and so were several other newly-acquired rare gallinaceous birds. These included two pairs of crested fireback pheasants and a trio of ocellated turkeys.

Looking ahead to the completion of the renovation of the Eagle Aviary, the Department of Ornithology obtained a prospective mate for the zoo's male Andean condor, a resident here since 1949.

On December 12, Mr. Marvin Cecil, a Florida aviculturist, returned from a National Geographic Society collecting trip in Argentina with 13 torrent duck eggs and three ducklings. This species, which lives in the rushing mountain streams of the Andes, had never been maintained in captivity. Mr. Cecil asked for assistance in the hatching and rearing of these unusual ducks. Most of the eggs hatched and five of the zoo-hatched ducklings, plus the three ducklings that were brought to the zoo, were thriving at the year's end.

As part of the department's efforts to propagate its collection, 40 species of birds were bred during the year. All told, 200 birds hatched at the zoo were raised by the department.

The highlight of the ornithology department's 1969 breeding program was the successful breeding of the European avocet — the first time this has been accomplished at the Bronx Zoo, and possibly the first event of its kind in North America.

Among the other birds successfully bred during the year were the gray-breasted parakeet, puna teal, and white-faced tree duck. The parakeets were of special interest because they had not been bred at the zoo before. These are the only members of the parrot family that build a nest of sticks.

Stilts — both the black-necked and black-winged varieties — have been reared at the Bronx Zoo for several years in the Aquatic Birds building, but never before with such success. Thirteen young stilts were reared. Young stilts, herons, waterfowl, and gulls were among the surplus birds sent to other zoos.

For the first time at the zoo, black-necked screamers, tawny frogmouths, and white-quilled black bustards all managed to hatch young. Unfortunately, however, none were reared successfully, but considerable insight was gained into raising the young of these birds. The single screamer chick was observed while it was being bill-fed by its parents.

A project designed to modernize diet preparation and feeding was undertaken this year with

the establishment of a commissary in the Large Bird House. New equipment, providing more refrigeration space and up-to-date grinders, slicers and mixers, were installed in a room adjacent to the old kitchen, which was also refurbished and equipped with a dishwasher. Techniques still need to be developed to make full use of this experimental area but once carefully worked out, they will eliminate much duplication of effort and equipment, as well as provide very useful data for a large central commissary planned for the entire park.

Expansion of the bird house kitchen facilities made it necessary to relocate the keepers' room. A basement area, below the manager's office, was renovated for this purpose providing a pleasant and somewhat larger locker room.

An electrical line from the Aquatic Birds building to the Large Flying Cage was installed during the fall. A series of heat lamps provide minimal heat in selected areas to prevent food from being frozen and also to allow several delicate species to remain outdoors during the harsher winter months.

CENSUS OF BIRDS
December 31, 1969

| Orders | Families | | |
|--|------------------------|----------|-----|
| | Species and Subspecies | Specimen | |
| SPHENISCIFORMES | | | |
| penguins | 1 | 8 | 61 |
| STRUTHIONIFORMES | | | |
| ostriches | 1 | 2 | 4 |
| RHEIFORMES | | | |
| rheas | 1 | 2 | 22 |
| CASUARIIFORMES | | | |
| cassowaries and emus | 2 | 3 | 14 |
| TINAMIFORMES | | | |
| tinamous | 1 | 3 | 18 |
| PODICIPEDIFORMES | | | |
| grebes | 1 | 2 | 5 |
| PELECANIFORMES | | | |
| pelicans, cormorants, etc. | 3 | 8 | 25 |
| CICONIIFORMES | | | |
| herons, ibises, storks, etc. ... | 5 | 24 | 108 |
| PHOENICOPTERIFORMES | | | |
| flamingos | 1 | 6 | 48 |
| ANSERIFORMES | | | |
| swans, ducks, geese, and screamers | 2 | 83 | 489 |
| FALCONIFORMES | | | |
| vultures, hawks, and eagles .. | 3 | 14 | 23 |
| GALLIFORMES | | | |
| quail, pheasants, etc. | 2 | 17 | 90 |

| | | | |
|---|----|-----|-------|
| GRUIFORMES | | | |
| hemipodes, cranes, trumpeters, etc. | 7 | 26 | 93 |
| CHARADRIIFORMES | | | |
| plovers, sandpipers, gulls, etc. | 9 | 44 | 231 |
| COLUMBIFORMES | | | |
| pigeons, doves, and sandgrouse | 1 | 15 | 32 |
| PSITTACIFORMES | | | |
| parrots, etc. | 1 | 18 | 73 |
| CUCULIFORMES | | | |
| touracos and cuckoos | 1 | 6 | 8 |
| STRIGIFORMES | | | |
| owls | 1 | 17 | 34 |
| CAPRIMULGIFORMES | | | |
| frogmouths, nighthawks, etc. | 2 | 2 | 9 |
| APODIFORMES | | | |
| hummingbirds | 1 | 2 | 2 |
| COLIIFORMES | | | |
| colies | 1 | 1 | 4 |
| TROGONIFORMES | | | |
| trogons, quetzals | 1 | 4 | 4 |
| CORACIFORMES | | | |
| kingfishers, hornbills, etc. ... | 5 | 14 | 27 |
| PICIFORMES | | | |
| barbets, toucans, and woodpeckers | 3 | 6 | 11 |
| PASSERIFORMES | | | |
| perching birds | 25 | 155 | 454 |
| Totals | 81 | 482 | 1,889 |
| Summary: orders, 25; families, 81; species and subspecies, 482; specimens, 1,889 | | | |

Species of birds new to the collection during 1969:

Chilean torrent duck, *Merganetta armata armata*
Gould
Malay peacock pheasant, *Polyplectron malacense malacense* (Scopoli)
two-banded courser, *Rhinoptilus africanus gracilis* (Fischer and Reichenow)
Burmese barred owlet, *Glaucidium cuculoides rufescens* Baker
southern spotted owlet, *Athene brama brama* (Temminck)
blue-fronted lance-bill, *Doryfera johannae johannae* (Bourcier)
blue-breasted hummingbird, *Amazilia amabilis amabilis* (Gould)
brown inca, *Coeligena wilsoni* (DeLattre & Bourcier)
Colombian sun glory, *Heliodoxa jacula jacula* (Gould)
Emin's barbet, *Trachyphonus darnaudii emini* Reinchenow
D'Orbigny's cotinga, *Pipreola intermedia signata* (Hellmayr)
Peruvian manakin, *Pipra chloromeros* Tschudi



Malay banded pitta, *Pitta guajana irena*
(Temminck)
Gurney's pitta, *Pitta gurneyi* Hume
Tehuantepec green jay, *Cyanocorax yncas vividus*
(Ridgway)
Van Hasselt's sunbird, *Nectarinia sperata*
brasiliانا (Gmelin)
southern double-collared sunbird, *Nectarinia*
chalybea pintoii Wolters
red-shouldered sunbird, *Anthreptes rhodolaema*
Shelley
northern orange-bellied flower-pecker, *Dicaeum*
trigonostigma rubropygium Baker
western red-shouldered whydah, *Euplectes*
axillaris bocagei (Sharpe)
western olive tanager, *Chlorospingus*
ophthalmicus flavopectus (Sclater & Salvin)
black-chinned canary, *Serinus atrogularis* (Smith)
yellow-bellied canary, *Serinus flaviventris*
(Swainson)

DEPARTMENT OF HERPETOLOGY

F. Wayne King, *Curator*
Robert Brown, *Assistant Curator*
Peter J. Brazaitis, *Assistant Animal Manager*

Reptiles and amphibians often are creatures of the Earth's hidden places, and although frequently common, they are probably the most misunderstood of higher animals. Once these interesting and often curious creatures are seen in suitable surroundings, fear and misconception are replaced by understanding of their role in nature. With this philosophy in mind, the Bronx Zoo's building for reptiles and amphibians was renovated and reopened during the past year.

The Department of Herpetology has placed on exhibit in the building more than 600 snakes, lizards, turtles, frogs, and other reptiles and amphibians. All live in surroundings which attempt to portray parts of the natural environments of the animals. Development of these exhibits, a long and thoughtful process, required

the collaboration of the Department of Exhibition and Graphic Arts.

Among the major attractions of the newly-renovated building is a "tropical storm" at the crocodile pools, complete with drenching rain, the sound of thunder, and lightning flashes. The lightning and thunder are simulated by the electronic equipment installed in the work area of the building, off public view.

Other exhibits include a tropical rain forest, a desert scene, a quiet temperate pond populated by amphibians, and a tumbling mountain stream. In this renovated building visitors can find magic in a face-to-face encounter with a tiny frog, not much longer than a man's thumbnail and fiery red in color. They can look through clear glass at the giant snakes of the world, or, in total safety, stand a few feet from a king cobra — one that was hatched and reared at the zoo, incidentally.

In an attempt to increase the quality of the department's exhibits, the number of species in the reptile and amphibian collection was reduced. At the year's end, the collection totaled 215 specimens and 42 species and subspecies of amphibians, and 420 specimens and 199 species and subspecies of reptiles. Among the notable acquisitions were a female pitted-shell turtle, a potential mate for our male specimen, and two Johnson's crocodiles. Unfortunately, a pair of tuatara received from the New Zealand government in June died several months later. Their deaths were caused by an undescribed protozoan pathogen.

As the number of species on exhibit is reduced, additional room is gained for breeding groups of animals. In August, a pair of Egyptian cobras bred. A clutch of eggs resulted from the mating and yielded eight hatchlings in October. Five young were born as a result of the breeding of pigmy rattlesnakes, a species that bears living young.

CENSUS OF AMPHIBIANS AND REPTILES December 31, 1969

| Orders | Species and Subspecies | Specimens |
|----------|---------------------------|-----------|
| AMPHIBIA | 42 | 215 |
| REPTILIA | 199 | 420 |

Summary: orders, 5; families, 41; species and subspecies, 241; specimens, 635.



ANIMAL HEALTH

Keeping a collection of different animals from all over the world healthy year-round is a demanding job. The diversity of diets alone is staggering. Members of the animal departments and of the veterinary staff must be continually on the alert for the appearance of disease or injury. The animal hospital must be able to handle a variety of situations involving all sorts of animals.

Some of the more interesting cases treated at the hospital during the year were the successful treatment of a male mountain gorilla for enteritis, of a seriously lame foot in a king penguin, and of two colobus monkeys that had contracted hepatitis.

The animal hospital was the site of a series of experiments in treatment with antibiotics of "red leg," a serious disease of frogs and toads. Some positive results were obtained.

The zoo's long-term veterinarian, Dr. Charles P. Gandall, resigned early in the year. Nevertheless, he continued to provide medical care for the zoo's collection well into the summer and to aid the society in locating a new veterinarian until an appointment was made. Assistance was also provided by Dr. S. K. Liu of the Animal Medical Center, New York City, and the pathology staff of the center, as well as from consulting pathologist Dr. John M. Budinger. Dr. C. E. Fletcher, who has been the zoo's emergency veterinarian for many years, and his assistant, Dr. B. Rosenquit, also provided service during the transition period. Dr. Emil Dolensek was appointed to fill the veterinary vacancy.

THE COMBINED CENSUS OF THE COLLECTIONS
OF THE NEW YORK ZOOLOGICAL SOCIETY

| | Species and Subspecies | Specimens |
|----------|---------------------------|-----------|
| Zoo | 922 | 3,512 |
| Aquarium | 317 | 2,969 |
| Total | 1,239 | 6,481 |



THE AQUARIUM COLLECTION

NEW YORK AQUARIUM

Ross F. Nigrelli, *Director*

Nixon Griffis, *Administrative Assistant*

Robert A. Morris, *Curator*

U. Erich Friese, *Assistant Curator*

Lars Mellkvist, *Superintendent, Operations*

George Mrzena, *Manager, Facilities Department*

Even in a year when man rocketed to his first landing on the moon, his exploration of "inner space," the world beneath the sea, continued to capture the fancy of millions of people. As the exploration of the sea and development of its resources progresses, the task of institutions such as the New York Aquarium becomes increasingly important, for through understanding of the sea, man can prevent its exploitation and eventual despoilation.

The aquarium has opened a window on creatures of lake, sea, and stream for millions of people — 443,542 people visited it during 1969. Those who came in late summer and early fall saw a marine animal never before exhibited by an aquarium. It was a narwhal — in this case a two-month-old calf. Male narwhals, and some females, have a long spiral tusk that can grow to the length of ten feet. The function of the tusk is not precisely known, but it may be a sexual characteristic.

The narwhal calf had been captured by Eskimos after its mother had been killed. The calf, not yet weaned, was placed in a pond at the Eskimo village of Griesse Fjord, on lonely Ellesmere Island in the Canadian Arctic. In an effort to keep the young whale alive, a team led by Curator Robert Morris was dispatched to Griesse Fjord. The calf was flown to the New York Aquarium and placed in one-half of the aquarium's whale pool.

The calf lived for several weeks, but then died of pneumonia on October 7. While it lived, however, aquarium scientists and visiting zoologists learned much about the creature and its behavior in captivity. Information gained during this period should be of considerable value if another attempt is made to exhibit a narwhal.

Another expedition, made up of members of the aquarium staff and scientists of the Osborn Laboratories of Marine Sciences, traveled to the Virgin Islands in February. Fish and invertebrates were collected and shipped to the aquarium and

the laboratories, and a motion picture was made of collecting activities.

Assistant Curator U. Erich Friese headed the aquarium's annual collecting trip to Bermuda, where 373 specimens were collected. Most were placed on exhibit at the aquarium.

Not all collecting was done in far places. Several efforts were made in local waters, ranging from the Hudson River off Croton-on-Hudson, New York, to the New York bight area. Several trips were made to Barnegat Bay, New Jersey, where the aquarium's collecting boat was berthed.

Many of the fish collected on these trips — including ocean pout, longhorn sculpin, and sundial flounder — were placed in a renovated series of exhibits of local water life.

The renovated and reopened electric fish exhibit is a multi-media presentation that uses an array of electronic equipment to demonstrate and explain the electric properties of electric eels, electric catfish, South American knife fish, and elephant-nose fish. The exhibit includes a taped narration, a voltage meter that registers the number of volts the eel generates, an "eel-powered" strobe light, and the amplified sound of the eel's electrical discharges. An oscilloscope visually displays the electric field continually generated by the knife fish.

Chances are good that one new exhibit presented during the year will be an all-time favorite. It is the "please touch" exhibit, where sea urchins, horseshoe crabs, starfish, clams, and other invertebrates may be handled. Youngsters daily crowded around this exhibit, many of them not only seeing but handling clam or starfish for the first time.

Preparations began during the year for a show demonstrating the fascinating behavior of dolphins. Trainer "Gerry" Watmore started a daily conditioning routine, teaching Pacific white-sided dolphins to perform such feats as tail-walking, fetching a baton, and leaping, at a signal, through

a hoop. The training routine was open to the public and attracted large crowds, an indication that a full-fledged dolphin show, planned for the next season, would evoke considerable public interest.

During the year several classes from the John Dewey High School oceanography program were held at the aquarium. Instruction was given by members of the staff.

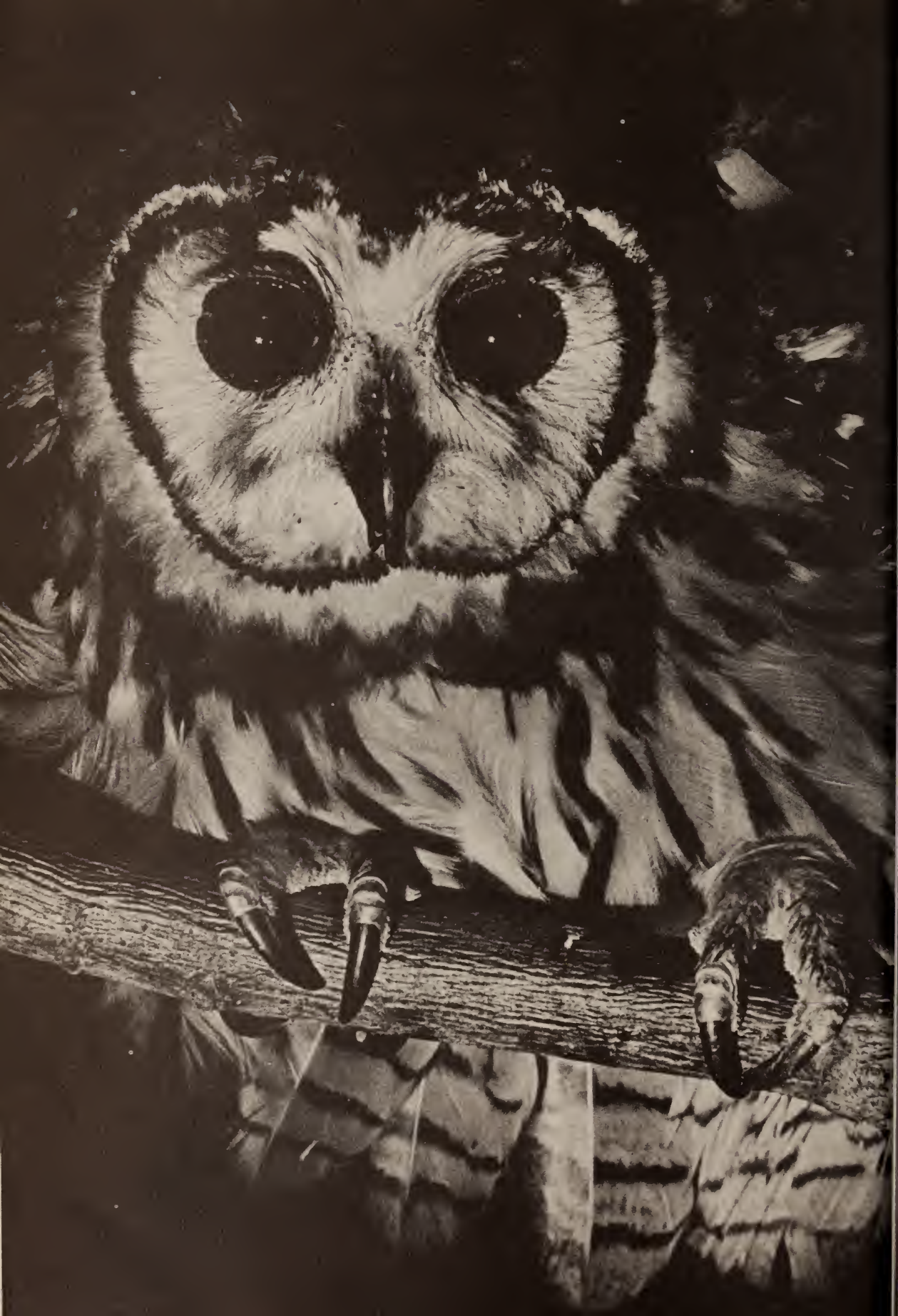
AQUARIUM 1969 CENSUS

| Orders | Species and Subspecies | Specimens |
|--|------------------------|-----------|
| Phylum: CHORDATA | | |
| Class: CHONDRICHTHYES | | |
| sharks, rays, and chimeras | | |
| SQUALIFORMES | | |
| sharks | 3 | 9 |
| RAJIFORMES | | |
| rays, skates | 3 | 6 |
| Class: OSTEICHTHYES | | |
| Bony fishes | | |
| DIPTERIFORMES | | |
| lungfishes | 2 | 2 |
| ACHIPENSERIFORMES | | |
| sturgeon | 1 | 1 |
| LEPISOSTEIFORMES | | |
| gars | 1 | 1 |
| CLUPEIFORMES | | |
| tarpon, bonefish | 2 | 6 |
| CYPRINIFORMES | | |
| catfishes | 4 | 38 |
| ANGUILLIFORMES | | |
| eels, morays | 3 | 4 |
| GASTEROSTEIFORMES | | |
| sticklebacks, pipefishes, sea horses | 4 | 39 |
| CYPRINODONTIFORMES | | |
| killies, cavefishes | 2 | 58 |
| BERYCIFORMES | | |
| squirrelfishes, soldierfish .. | 4 | 12 |
| PERCIFORMES | | |
| perch-like fishes | 213 | 732 |
| PLEURONECTIFORMES | | |
| flatfishes | 6 | 13 |
| TETRAODONTIFORMES | | |
| trunkfishes, triggerfish, puffers, cowfish | 5 | 51 |
| BATRACHOIDIFORMES | | |
| toadfishes | 1 | 12 |
| Class: REPTILIA—Reptiles | | |
| TESTUDINES | | |
| turtles | 4 | 7 |
| Class: AVES—Birds | | |
| SPHENISCIFORMES | | |
| penguins | 2 | 17 |
| PELECANIFORMES | | |
| pelicans | 1 | 2 |
| Class: MAMMALIA—Mammals | | |
| PINNIPEDIA | | |
| seals, sea lions | 6 | 15 |
| CETACEA | | |
| whales, dolphins. | 3 | 7 |

| | | |
|------------------------------|-----|-------|
| Phylum: PORIFERS | | |
| Class: DEMOSPONGIAE | | |
| siliceous, horny sponges . . | 2 | 20 |
| Phylum: COELENTERATA | | |
| Class: ANTHOZOA | | |
| anemones, corals | 9 | 1,220 |
| Phylum: ANNELIDA | | |
| Class: POLYCHAETA | | |
| marine worms | 3 | 24 |
| Phylum: ARTHROPODA | | |
| Class: CRUSTACEA | | |
| lobsters, shrimps, crabs . . | 11 | 289 |
| Class: ARACHNIDA | | |
| horseshoe crabs | 1 | 6 |
| Phylum: MOLLUSCA | | |
| Class: GASTEROPODA | | |
| snails | 2 | 7 |
| Class: PELECYPODA | | |
| oysters, clams | 3 | 314 |
| Class: CEPHALOPODA | | |
| octopus, squid | 2 | 2 |
| Phylum: ECHINODERMATA | | |
| Class: ASTEROIDEA | | |
| starfishes | 10 | 32 |
| Class: ECHINOIDEA | | |
| sea urchins | 3 | 20 |
| Class: HOLOTHUROIDEA | | |
| sea cucumbers | 1 | 3 |
| TOTALS | 317 | 2,969 |

Summary: species and subspecies, 317; specimens, 2,969.







WORLD OF DARKNESS

"The World of Darkness" — even the name of the newest exhibits building at the Bronx Zoo is calculated to arouse interest and curiosity. And certainly, the World of Darkness was the first destination of many of the 2,335,693 visitors who toured the zoo in 1969. They saw wild animals presented as never before in a zoo. Highly experimental in theory and design, the World of Darkness represents a major step in the New York Zoological Society's efforts to build a zoo of the future for zoo visitors of today.









MORE THAN THE ANIMALS

Before the year was over, it was apparent that the next decade, the seventies, would be one in which vast numbers of people would become aware of the fragile but extremely fundamental links between all organisms and the environment. If 1969 heralded the dawning of the Aquarian Age, it even more presaged the age of ecological awareness.

Ecology is a science that involves multiple interrelationships, often extremely subtle — such as the passage of molecules along the food chain. While this sort of thing may be very apparent to ecologists and biochemists, most of us can better appreciate the earth's living environment by looking at the broader picture.

One of the best ways to evoke an understanding of how organisms interact with their environment is to watch live wild animals in their natural habitats. Many people, however, will never glimpse scarlet ibises probing for crustaceans on a tropical mudflat, nor see a stonefish blend into the background of an Indo-Pacific reef. And a dismayingly larger number of people — mostly residents of the city's core — will never even see a frog floating spread-eagled in a woodland pond.

DEPARTMENT OF EXHIBITION AND GRAPHIC ARTS

Jerry M. Johnson, *Curator*

The next best thing to watching animals in the wild is to see them at a zoo or aquarium — particularly if the animals are exhibited in surroundings that as closely as possible duplicate natural habitats. On this concept rests the New York Zoological Society's philosophy of exhibiting wild animals.

Working with curators of the animal departments, the Department of Exhibition and Graphic Arts develops and constructs simulated natural habitats that are hard to tell from the real thing. This year, the department was involved in preparing exhibits for the World of Darkness, a huge job that had exhibits crews working for months long into the night.

Caves had to be constructed, tropical rain forests designed and built, sandy deserts had to be simulated, and several striking graphics that explained the life of nocturnal and cave creatures to visitors were completed.

At the same time, the department worked with the Department of Herpetology on exhibits in the renovated building for reptiles and amphibians. The entire tone of exhibits in the building was changed and a tile wall mural, depicting the variety of reptile and amphibian life, was designed and executed by graphic artist Eideen Molloy. Graphics and labels that, in an attractive manner, tell visitors about the wild world are one of the main factors that make the zoo and aquarium centers of natural science education.

The department, with the staff of the aquarium, worked on plans for a new whale and dolphin stadium, and with the mammal department staff, developed exhibit plans for the renovated Great Apes building at the zoo.

Seeing live wild animals constitutes the essence of a visit to a zoo or an aquarium, but to be complete the visit must involve more than just looking at animals. Proper exhibition of wild creatures can mean the difference between success and failure in the effort to present a bit of the earth's living environment.

FACILITIES DEPARTMENT

Alden Johns, *Manager*

The experience of a zoo or aquarium visit, however, must be recreational as well as educational. On a nice day, there's nothing better than a tasty hot dog, a bottle of pop, or a bag of popcorn. During 1969 the zoo's Facilities Department served up an astounding amount of food and drink: 319,368 ice cream pops, 39,072 ice cream cones, 50,148 ice cream cups, 572,520 franks, 230,622 hamburgers, 511,960 cold drinks, 143,208 bags of popcorn, and thousands of other goodies.

The cafeteria, renovated according to a design by the Department of Exhibition and Graphic Arts, and renamed the Peacock Pavilion, became a much more pleasant place to eat a leisurely lunch.

And, if you're a youngster, what is a day at the zoo without a ride on a camel? Or a trot around the track on a jaunty pony? A total of 213,681 youngsters climbed aboard riding animals at the zoo's riding track during the year.

CONSTRUCTION AND MAINTENANCE

Charles B. Driscoll, *Superintendent of Operations*
George Russell, *Assistant Superintendent of Construction*

Louis Sanders, *Assistant Superintendent of Maintenance*

Newly-painted refreshment stands, green lawns, and gardens of shrubbery also contributed to make visits to the zoo pleasant. In 1969, the Department of Construction and Maintenance planted 2,100 trees and shrubs, 1,950 annuals, and 167 semi-tropical plants. On the zoo's Baird Court, the last of a group of diseased American elm trees were removed and replaced with pin oaks and honey locusts. This concluded replanting of elms in this area which were stricken by Dutch elm disease during the past 12 years.

The Department of Construction and Maintenance, never in the limelight, in reality keeps the wheels at the zoo moving. Few people see the zoo's carpenters and electricians, gardeners and maintainers, but they are critical to the entire operation. This department is involved in every major building project at the zoo. During 1969, major projects included the cafeteria renovation, construction of a new lobby in the reptile and amphibian building, modification of the zoo's entrance gates for a better traffic flow, and installation of 4,920 square yards of paving on 300 pathways and roads.

Major projects underway in 1969:
development of the Australian zoogeographic area
renovation of the building for Reptiles and

Amphibians
renovation of the Great Apes building
construction of the Eagles and Vultures Aviary
construction of the World of Birds
construction of the World of Darkness
renovation of the cafeteria
construction of curatorial offices in the

Administration Building
modification of entrances to the zoo





FISH EMBRYO

RESEARCH

New York Zoological Society research projects during the year ranged from the search for drugs from the sea to the study of the ecology of predators and prey on the plains of East Africa. Investigations in some of the most exciting areas of contemporary science were carried out in the field and at the society's three research centers — the Osborn Laboratories of Marine Sciences, the Institute for Research in Animal Behavior, and the William Beebe Tropical Research Station. The Osborn Laboratories are located at the New York Aquarium, the Beebe Research Station is in Trinidad, and the Institute for Research in Animal Behavior has facilities at the zoo and the Rockefeller University, the society's partner in operation of the institute.

At the same time, members of the staff at the zoo and aquarium conducted research related to maintaining animals in captivity and on conservation of threatened species. The society also sponsored and assisted several scientists from other institutions in research projects.

OSBORN LABORATORIES OF MARINE SCIENCES

Ross F. Nigrelli, *Director and Pathologist*

Martin F. Stempien, Jr., *Assistant to the Director and Bio-Organic Chemist*

George D. Ruggieri, S.J., *Coordinator of Research and Experimental Embryologist*

The Osborn Laboratories continued in its many-faceted approach to the scientific study of the sea.

Dr. Ross F. Nigrelli initiated a series of studies on protozoan parasites of fish with Dr. Jiri Lom of the Czechoslovakia Academy of Sciences, who is presently at the University of Illinois, Chicago Circle. Dr. Nigrelli also completed studies on parasites of barnacles with Dr. Lucie Arvy of Laboratoire d'Histoencyzomologie de la Faculte de Medicine di Paris, France.

Dr. Martin F. Stempien, Jr., found an antibiotic substance in the West Indian sponge, *Haliclona viridis*. Although the substance is unstable, some of its reactions are similar to structures such as epinephrin and chloramphenicol, two very potent natural substances of medical importance: the former is a heart stimulant and the latter an antibiotic.

Dr. George D. Ruggieri, S.J., isolated biological compounds called saponins from representative species of the five classes of the phylum Echinodermata (sea cucumbers, sea stars, sea urchins, brittle stars, sea lilies, etc.). Most of these saponins cause hemolysis of human red blood cells, are lethal to fish, and cause various developmental faults in the sea urchin.

Dr. Jack T. Cecil has been able to infect experimental cultures of cells from marine mammals with a variety of human and animal viruses. His work suggests that tissue cultures of marine mammals may be used to isolate, identify, and evaluate pathogenic human viruses. Further studies are being continued on isolating naturally occurring anti-viral and anti-tumoral substances from marine organisms.

Dr. Kenneth Gold has continued his studies on the plankton of lower New York Bay. He has identified the major forms found in this body of water and is growing many of them in pure culture in the laboratory. Therefore, a variety of protozoa have now been isolated and their nutrient requirements are being determined. Availability of these organisms under bacteria-free conditions will make it possible to investigate their roles as regenerators of nutrients and as competitors with larger zooplankton for food. Many of these species of microscopic organisms may prove to be valuable indicator organisms for specific pollutants.

Dr. Vincent R. Liguori has continued studies on the chemical nature of the barnacle cement. Researchers have long sought a clear understanding of the nature of this material that sticks in water. Knowledge in this area will help to combat fouling of ships and wharves by barnacles. Dental scientists are also interested in how barnacle cement sticks in water.

Dr. Myron Jacobs and his collaborators, Dr. W. L. McFarland of the Armed Forces Radiobiology Laboratory, Bethesda, Maryland, and Mr. P. J. Morgane, of the Wistar Foundation for Experimental Biology, Shrewsbury, Massachusetts, carried on an extensive study of the brain ventricle system of the bottle-nose dolphin. It appears that this system is less complex than that found in the land animals and correlates well with the importance of the auditory system in the dolphin.

Dr. Klaus Kallman has had a stock of platy fish, *Xiphophorus maculatus* (Jp 30), reach its 50th generation of inbreeding. The original stock dates back to 1939 and has been continuously maintained in the Genetics Laboratory. Dr. Kallman's studies include the role of pigment cell genes in melanomas. By studying a rare gene rearrangement that occurs spontaneously in one of our inbred stocks, evidence has been obtained that under normal conditions the expression of the pigment gene is held within limits by a second, closely linked "regulator" gene. In two instances in which the two genes became separated, abnormal patterns or melanomas developed.

INSTITUTE FOR RESEARCH IN ANIMAL BEHAVIOR

Peter R. Marler, *Director and Senior Research Zoologist*

Richard L. Penney, *Assistant Director and Research Zoologist*

The Institute for Research in Animal Behavior continued to support its varied affiliates who are pursuing a broad range of investigations in the field of animal behavior. Work space, professional associations, grants, and access to experimental colonies were made available to 15 investigators whose projects included laboratory experiments, studies in the Bronx Zoo, and observations in the field.

Dr. Donald R. Griffin, director of the institute until November, continued his radar studies of nocturnal bird migrations and mechanisms of bird navigation through thick cloud layers that eliminate visual cues from either sky or ground. Dr. Griffin carried on his studies at Mt. Peter, New York. In laboratory studies at the zoo he

experimented with bat echolocation using a wind tunnel in which it is possible to record sound emission from a flying animal. His studies have opened up areas he intends to explore further, such as how to determine whether birds are sensitive to atmospheric pressure and if they use this sensitivity to determine their altitude when visual cues are lacking.

Dr. Peter R. Marler, the newly appointed director of the institute, worked in conjunction with Dr. Paul Mundinger on a comparative study emphasizing vocal communication systems in cardueline birds, a subfamily of the finches. The emphasis in prior years was on visual communication. The comparative study should shed light on the evolution of communication systems among the carduelines. Another project involved an examination of the degree to which learning from adult birds is important for song development in young males. These experiments may determine if factors such as the critical periods for bird song learning and the importance of auditory feedback for development of song are species-specific.

Mrs. Jocelyn Crane Griffin continued a 15-year project on the behavior of fiddler crabs with a trip to New Guinea where she concentrated on aggression and its ritualization in a socially primitive species. At the Tropical Research Laboratory at the zoo, she has revised the taxonomy of 60 species of fiddler crabs. A special fiddler crab laboratory was built at the zoo for her research.

During the first part of the year, Dr. Fernando Nottebohm completed a 10-month study of the Amazon parrot, *Amazona amazonica*, in Trinidad. Field observations revealed six dialects in the Trinidadian subspecies. Further studies were conducted on parrots in the zoo. The dialects corresponded roughly to varying habitat types on the island and a kind of duetting between members of a pair which may serve to maintain bonds. Dr. Nottebohm's work later in the year centered upon an experimental study of song development in a song bird, the European chaffinch, and a field study in Argentina on dialect systems of the Chingolo sparrow.

RESEARCHERS AT
OSBORN LABORATORIES



The study of vocal communication systems engaged another investigator as well. Over a 14-month period in Japan, Mr. Steven Green tape-recorded the audible behavior of three wild troops of Japanese macaque monkeys. He hopes to elucidate the vocal repertoire of each of the troops, compare these vocal ethograms for evidence of dialects, and determine if there are correlations between vocalizations and the situations in which they occur or the responses which they evoke.

In April and May, Dr. Roger S. Payne towed a pair of hydrophones (underwater microphones) behind a 35-foot sloop in the waters around Bermuda to record humpback whale sounds, which from previous studies and analysis are believed to be song. Dr. Payne has also found that whales, which linger near Bermuda for several days en route to northern breeding grounds, seem to set up singing stations on the offshore banks and periphery of Bermuda. In the evening they gather on one of these banks and sing there throughout the night. Within an over-all species pattern in humpback whale songs, Dr. Payne has recorded and analyzed by means of a sound-spectrograph several distinct song types or dialects. Individual whales sing their own songs, he believes. He hopes to locate the same whales at the same singing stations in 1970.

Dr. Thomas T. Struhsaker spent most of the year analyzing and writing up field data on the comparative ecology and behavior of many species of West African guenon monkeys. He found that vocalizations are a stable marker, useful in determining taxonomic affiliations. In December he departed for Africa to begin an 18-month study of the ecology and behavior of red colobus monkeys, starting with a transcontinental survey of red colobus populations across equatorial Africa.

Dr. George Schaller completed the three-and-one-half year field portion of his ecological study of the relationships between predator and prey populations of the Serengeti: the effect of predation on the prey populations; the distribution of age and sex classes among the victims; and the predatory behavior itself, including frequency of kills and amount of daily intake. A wide range of behavioral observations was gathered emphasizing the lion, and including the cheetah, wild dog, and leopard. The last two months of the year were spent in India on a census and behavior study of the Nilgiri tahr.

Investigators utilized two groups of mammals in the society's collection for studies in the park. Dr. Katherine Ralls investigated scent-marking behavior among Maxwell's duikers, a small forest dwelling antelope. These animals mark by rubbing their conspicuous maxillary gland on objects and other duikers. In three groups, each consisting of one male and two females, she found that males scent-marked twice as frequently as females. Dominance between females seemed to correlate with frequency of scent-marking, and frequency of scent-marking by both males and dominant females increased after contact with a duiker of the same sex.

Dr. Amelia Segre completed more than a year's observations on a successfully breeding group of the zoo's talapoin monkeys. She focused upon grooming behavior and found striking individual differences in this behavior, including manner of initiation and termination of grooming sessions, which seem to correlate with the groomer's sex and age class rather than that of the animal being groomed. Few talapoin studies have been done: the small animals are difficult to observe in their limited wild habitat, the leafy canopy of west African rain forests, and they are rarely maintained as successful breeding colonies. In a project, on birds, at the behavior laboratory, Dr. Segre used a temporary dye on feathers of captive male ruffs and found that color changes in an individual modified the response of other birds toward it.

Dr. Richard L. Penney, assistant director of the institute, continued a four-year study of Adelie penguins, centering the year's work on their mechanisms of navigation and thermoregulation. Six more Adelies were bred and reared in captivity.



At the society's William Beebe Tropical Research Station, Dr. Jack Bradbury studied five species of local neotropical bats. Evidence in support of the existence of harems, stereotyped displays similar to birds, and complex social structures was gathered.

Dr. Alan Lill continued observations on social and sexual interactions at leks and feeding sites among neotropical manakins and finches, with a view toward elucidating the evolution and functional significance of their social organization. Mr. O. Marcus Buchanan, resident director in Trinidad, studied the biology of *Carollia* and certain nectar-feeding bats.



RESEARCH BY THE ZOO STAFF

Several research projects were carried out by the zoo's Department of Ornithology. Assistant Curator Donald Bruning continued his study of the physical and behavioral development of rheas. He observed and compared development of young birds raised by their parents and young that were hand-reared. Research also continued on the use of food additives that enable zoo birds to maintain the same colors they do in the wild.

Curator of Herpetology F. Wayne King traveled to Komodo Island, Indonesia, where Dr. Walter Auffenberg of the University of Florida, a research associate of the society, is conducting a year-long study of the giant Komodo monitor, world's largest living lizard. Dr. King helped initiate the study, the results of which, it is hoped, will contribute to the conservation and management of this spectacular lizard.



JACKSON HOLE RESEARCH STATION

L. Floyd Clarke, *Director*

Two dozen different research projects, including studies of coyotes, jumping mice, and ground squirrels, were conducted under the direction of Dr. L. Floyd Clarke at the Jackson Hole Biological Research Station, which is supported in part by the society.



SPREADING THE MESSAGE

The society reinforced its educational efforts during 1969 with a variety of academic programs at its institutions, participation by staff members in conferences and meetings, and special programs and publications for members. At the same time, a wide audience was reached through the cooperation of the media, which made it possible to channel information through newspapers, magazines, television, and radio — and through the society's scientific and popular publications.

DEPARTMENT OF EDUCATION

Herbert J. Knobloch, *Curator*

Bonnie D. Green, *Zoology Specialist*

Patricia A. Gowaty, *Zoology Instructor*

The Department of Education concentrated on a highly successful experimental program with District 10 of the New York City Public Schools. The first phase of this new program, conducted from March to June, exposed 841 fifth grade youngsters from six Bronx elementary schools to the resources of the zoo. Students in the second phase of the program, which began in the fall, numbered 1,017. These students visited the zoo six times during the school year.

The program, financed by a New York State urban education grant, capitalized on a youngster's natural interest in animals to motivate him not only in science but in all academic subjects. School work in all subjects was tied to the zoo experience. A problem in mathematics, for instance, might be enlivened by relating it to the number of pounds of feed given to a group of animals in the zoo collection. Reading interest might be stimulated by reading a story about an animal, then observing the animal firsthand.

Other Department of Education programs included visits by zoology instructors to 35 schools, organizations, and institutions. The instructors lectured and exhibited animals to a total of 10,484 school children. In-service courses to instruct elementary and high school teachers in the use of the zoo in school science programs were given during the spring and fall. Three six-day natural history workshop courses were given for 75 junior high school students in the summer.

One-hundred-and-six films from the Department of Education's motion picture film library

were rented and viewed by 24,256 people during the year. In addition, staff officers showed 99 films on 83 occasions to audiences totaling 36,376 persons. The department worked with the Department of Publications and Public Relations in producing several films, including "Mission Narwhal" and a film on the late Fairfield Osborn, former president of the society.

PUBLICATIONS AND PUBLIC RELATIONS

Edward R. Ricciuti, *Curator*

Joan Van Haasteren, *Associate Editor*

Dorothy Reville, *Photo Librarian*

Sam Dunton, *Photographer*

William Meng, *Photographer*

Tsung S. Su, *Librarian*

Animal Kingdom, the society's popular magazine, presented a wide range of feature articles and news coverage. At year's end the *Animal Kingdom* press run was 12,000 copies per issue. The highlight of the year was a special issue on the World of Darkness, with an eight-page color section depicting animals and exhibits in the new building. Twenty-five thousand copies of this special issue were printed so the issue could be sold at the zoo. *Zoologica*, the scientific quarterly, had an issue press run of 1,050 copies. Among *Zoologica* subscribers are many noted scientific institutions and libraries.

The opening of the World of Darkness at the zoo and the aquarium's first narwhal received international coverage. Articles on the society and its institutions appeared in dozens of publications, including the *New York Times*, *Reader's Digest*, *Daily News*, *Wall Street Journal*, *Cue*, *Science and Mechanics*. Local and national television and radio coverage were given to the zoo and aquarium, and members of the zoo and aquarium staff appeared on several radio and television shows.

The society's photographers were active during the year. Mr. William Meng traveled with the aquarium's narwhal expedition to the Canadian Arctic to film "Mission Narwhal," and Mr. Sam Dunton photographed a definitive motion picture on the life history of the seahorse. Photographs taken by the society's photographers appeared in several newspapers and magazines and film footage provided by the society was

aired on local television. Still photographs and motion picture footage provided by the society were used for exhibits purposes at the American Museum of Natural History's Hall of Ocean Life.

The Department of Publications and Public Relations began modernization of the society's library. Mr. Tsung S. Su was employed as librarian to establish a fully-operative library in the Administration Building.

Mrs. Dorothy Reville and Mr. Joseph A. Davis, Scientific Assistant to the Director, designed and produced a conversion of the south room of the Heads & Horns Museum into a gallery for special art exhibits. The first show, which opened in June, featured large photographic color prints of bats taken by Miss Nina Leen, staff photographer for *Life* magazine. Following the Leen show, an exhibit of sketches and paintings by Joseph Sibal ran through the end of the year.

STAFF ACTIVITIES

Members of the staff published numerous scientific papers and popular articles during the year. These include:

Bell, Joseph

"The Monkey Eating Eagle (*Pithecopaga jefferyi*)."
Animal Kingdom, "Dying Species," Vol. 72, No. 4

Bell, Joseph, and Donald F. Bruning

"Breeding of the European Avocet in the New York Zoological Park (*Recurvirostra avosetta*)."
Avicultural Magazine, Vol. 75, No. 7, pp. 251-253.

Brazaitis, Peter J.

"The determination of sex in living crocodilians."
British Journal of Herpetology, 1969, 4(3): 54-58.

Bruning, Donald F.

"Life and Light."
Animal Kingdom, Vol. 72, No. 3, pp. 17-20.

"Scorpions."
Animal Kingdom, Vol. 72, No. 4, pp. 8-12.

"Breeding of the Ruff, *Philomachus pugnax* (Linnaeus), at the New York Zoological Park."
Avicultural Magazine, Vol. 75, No. 2, pp. 39-41.

"How Light Affects Life."
Nature and Science, Vol. 7, No. 9, pp. 14-16.

- "CO₂ and Water Loss in Scorpions." *Proceedings North Central Branch - E.S.A.*, Vol. 23(1), pp. 58
- Cecil, Jack T.
 "Mitoses in Cell Cultures from Cardiac Tissue of the Surf Clam *Spisula solidissima*." *Journal of Invertebrate Pathology*, Vol. 14; 407-410.
 "Cytological Abnormalities in Tissue-cultured Cells Treated with Extracts from Sponges." *Soc. Invertebrate Pathology, Newsletter*, Vol. II (2) (with M.F. Stempien and R.F. Nigrelli).
- Conway, William G.
 "A World of Darkness in the Zoo." *Animal Kingdom*, Vol. 72, No. 3, pp. 4-11.
 "Zoos: Their Changing Roles." *Science*, Vol. 163, No. 3862, pp. 48-52.
- Davis, Joseph A.
Beaver and Company. Harper and Row, New York.
 "Thylacine (*Thylacinus cynocephalus*)." *Animal Kingdom*, "Dying Species," Vol. 72, No. 1.
 "The Aye-aye (*Daubentonia madagascariensis*)." *Animal Kingdom*, "Dying Species," Vol. 72, No. 3.
- Gold Kenneth
 "The Preservation of Tintinnids." *J. Protozoology* 16:126-128.
 "Tintinnida: Feeding Experiments and Lorica Development." *J. Protozoology*, 16:507-509.
- Griffin, Donald R.
 "Echo-orientierung und Sfledermausflug." *Naturwissenschaft und Medizin*, 6 January, No. 27, Seite 3.
 "Bats - Animal Sonar Experts." *Animal Kingdom*, Vol. 72, No. 3, pp. 12-16.
 "The Physiology and Geophysics of Bird Navigation." *The Quarterly Review of Biology*, Vol. 44, No. 3.
- House, Hugh B.
 "And Then the Animals." *Animal Kingdom*, Vol. 72, No. 3, pp. 21-25.
- Jacobs, Myron
 "Ventricular System of the Brain of the Dolphin, *Tursiops truncatus*, with Comparative Anatomical Observations and Relations to Brain Specializations." *J. Comparative Neurology*, Vol. 135: 275-368 (with W.L. McFarland and P.J. Morgane).
- Kallman, Klaus
 "Enzymatic Activities in Tissues of Teleosts." *Comp. Biochem. Physiol.* 28: 771-776 (with G.E. Fried and M.P. Schreibman).
 "The Effect of Hypophysectomy on Freshwater Survival in Teleost of the Order Atheriniformes." *Gen. Comp. Endocr.* 13:27-38 (with M.P. Schreibman).
 "A New Fish of the Genus *Xiphophorus* from Guatemala, with Remarks on the Taxonomy of Endemic Forms." *Am. Mus. Nov.*, No. 2379:1-29 (with D.E. Rosen).
 "Evidence for the Existence of Transformer Genes for Sex in the Teleost *Xiphophorus maculatus*." *Genetics*, 60:811-828.
 "Pigment Patterns and Coadapted Gene Pools in Southern Platyfish, *Xiphophorus maculatus*." *Genetics*, 61 (suppl):s29-s30 (abstract).
 "Gonad Grafts in an Inbred Strain of Platyfish, *Xiphophorus maculatus* (XX♀♀, XY♂♂)." *American Zoologist*, 9(4): #140 (with M.P. Schreibman).
 "The Amazon Molly, *Poecilia formosa*, and Its Peculiar Mode of Reproduction." *Tropical Fish Hobbyist*, 17:17-31.
- King, F. Wayne
 "The Giant Lizards of Komodo." *Nature and Science*, 1969, 7(1): 5-7.
 "Adaptations for Nocturnal Survival." *Animal Kingdom*, Vol. 72, No. 3, pp. 29-30.
 "Texas Blind Salamander." *Animal Kingdom*, "Dying Species," Vol. 72, No. 2.
 "On the Diversity of Reptile and Amphibian Species in a Bornean Rain Forest." *The American Naturalist*, 1969, 102 (928): 497-515 (with Monte Lloyd and Robert F. Inger).

Liguori, Vincent R.

"Some New Approaches to the Study of Barnacles. *Ocean Engineering*, 1:469-474 (with A.C. Freiburger, C.P. Cologer, and R.F. Nigrelli).

"Comparative Histological Studies of the Cement Apparatus of *Lepas anatifera* and *Balanus tintinnabulum*." *Biological Bulletin*, 137:170-180 (with D. Lacombe).

Lill, Alan

"Allopreening in the Dove *Geotrygon montana*." *Condor*, 71:72.

Marler, Peter R.

"Tonal Quality of Bird Sounds." In: *Bird Vocalizations*, R.A. Hinde (ed.), Cambridge University Press, pp. 5-18

"Of Foxes and Hedgehogs: The Interface Between Organismal and Populational Biology-II." *Am. Zool.*, 9:261-267.

"Vocalizations of Wild Chimpanzees: An Introduction." *Rec. Adv. in Primat.*, Vol. I, pp 94-100.

"*Colobus guereza*: Territoriality and Group Composition." *Science*, January 3, Vol. 163, pp. 93-95.

"Animals and Man: Communication and Its Development." In: *Communication*, Roslansky (ed.), North Holland Publishing Company, Amsterdam.

Nigrelli, Ross. F.

"Effects of Temperature Upon 'Naturally Occurring' Blood Group Agglutinins in Fresh Water Catfish." *Journal of Immunology*, Vol. 103:62-65 (with W.J. Kuhns and J.V. Chuba).

"Studies on the Biology of Barnacles: Self-fertilization in *Balanus eburneus*." *American Zoologist*, Vol. 9(3) (with P.J. Cheung).

"Studies on the Biology of Barnacles: Parasites of *Balanus eburneus* and *B. balanoides* from New York Harbor and a Review of the Parasites and Diseases of Other Cirripedia." *Zoologica*, Vol. 54: 95-102 (with L. Arvy).

Nottebohm, Fernando

"The 'Critical Period' for Song Learning." *Ibis*, 111:386-387.

"The Song of the Chingolo, *Zonotrichia capensis*, in Argentina: Description and Evaluation of a System of Dialects."

Condor, 71:299-315.

"Experimental Studies in the Ontogeny of Avian Vocalizations." In: *Bird Vocalizations*, R.A. Hinde (ed.), Cambridge University Press (with M. Knoishi).

"The Parrots of Bush Bush." *Animal Kingdom*, Vol. 72, No. 1, pp. 18-23 (with Marta Nottebohm).

"The Use of Vision by the Little Brown Bat, *Myotis lucifugus*, Under Controlled Conditions." *Animal Behavior*, 17:480-485 (with Jack Bradbury).

Penney, Richard L.

"Adelie Penguin Orientation Under the Northern Sun." *Antarctic J. of the U.S.*, Vol. IV, No. 4, pp. 116-117 (with Donald Riker).

The Penguins Are Coming. Harper and Row, New York.

Ruggieri, George D., S.J.

"In Corpore Fertilization and Development in the Sea Urchin, *Arbacia punctulata*." *Nature*, 223:189.

"A Summer at Coney Island." *International Zoo News*, 15 (1).

Schaller, George

"Life with the King of Beasts." *The National Geographic*, 135 (4): 494-519.

"Observations on Lions in the Lake Manyara National Park, Tanzania." *East African Wildlife Journal*, 7:99-103.

"The Hunt of the Cheetah." *Animal Kingdom*, Vol. 72, No. 2, pp. 2-7.

"Observations on the Hangul or Kashmir Stag (*Cervus elephus hanglu* Wagner)." *J. Bombay Nat. Hist. Soc.*, 66 (1):1-7.

"Food Habits of the Black Bear (*Selenarctos thibetanus*) in the Cahigam Sanctuary, Kashmir. *J. Bombay Nat. Hist. Soc.*, 66 (1): 156-159

The Tiger: Its Life in the Wild. Harper and Row, New York (with M. Selsam).

Struhsaker, Thomas T.

"Correlates of Ecology and Society Organization Among African Cercopithecines." *Folia Primat.*, 11:80-118.

Staff members also took part in numerous educational and scientific activities at other institutions. Dr. Griffin, Dr. Marler, and Dr. Struhsaker offered a Rockefeller University field

course in behavior and ecology that was held in Trinidad and Panama. Dr. Nigrelli lectured at Union College, Schenectady, New York; at the Environmental Laboratories, Sterling Forest, New York; and at Long Island University. He was appointed to the Mayor's Oceanographic Advisory Committee, was awarded the Presidential Gold Medal of the New York Academy of Sciences, and presided at one of the scientific sessions of the Third International Conference on Protozoology held in Leningrad, U.S.S.R.

Dr. Nigrelli, Dr. Ruggieri, and Dr. Kallman conducted a symposium at the Downstate Medical Center, Brooklyn, New York, on the use of aquatic organisms in medical research.

Dr. Stempien presented a paper on "Physiologically Active Substances from Sponges" at the Gordon Research Conference on Medicinal Chemistry at Colby College. Dr. Stempien, Dr. Ruggieri, and Dr. Nigrelli presented a joint paper at the Food-Drugs From the Sea Conference sponsored by the Marine Technology Society at the University of Rhode Island.

Dr. Ruggieri chaired one of the sessions of the drugs-from-the-sea symposium at the University of Rhode Island and was elected co-chairman for the next symposium in 1971. He also was named to the Subcommittee on Marine Resources of the Mayor's Oceanographic Advisory Committee. He was appointed to an investigatory committee to look into fish kills in waters surrounding New York City.

Dr. Jacobs took part in a demonstration of the morphology and architecture of the cetacean brain at the Warren Anatomical Museum, Harvard Medical School.

Dr. Gold participated in the Second Symposium on Hudson River Ecology at Sterling Forest, New York; he gave a seminar at the Department of Biology, New York University Graduate School of Arts and Science, University Heights, on "Studies on Marine Phyto- and Micro-Zooplankton." He undertook studies in collaboration with Dr. Eugene Small, University of Illinois, on ultra-structural features of protozoa using the scanning electron microscope.

Dr. Liguori participated in a panel discussion on biological adhesives sponsored by the Office of Naval Research in Boston.

Dr. King was a participant in a joint American Society of Ichthyologists and Herpetologists and

American Fisheries Society symposium on the introduction of exotic species. This meeting took place in Washington, D.C., in February.

Mr. Conway continued as a director of the Cornell Laboratory of Ornithology, the National Audubon Society, the International Wild Waterfowl Association, and the Carribbean Conservation Corporation. He was also Chairman of the American Association of Zoological Parks and Aquariums Conservation of Wildlife Committee, vice-chairman of the American Committee for International Wildlife protection, and a member of the Advisory Committee of the International Zoo Yearbook and of the Survival Service Commission.

Mr. Conway and Associate Curator of Ornithology Joseph Bell attended the meeting of the International Wild Waterfowl Association in Plainview, Long Island. Mr. Bell was elected a Director of the association.

Dr. King and Mr. Edward R. Ricciuti, Curator of Publications and Public Relations, participated in meetings and activities of the American Alligator Council, a new organization dedicated to preserving the American alligator.

Under the direction of Personnel Manager Frank J. Manhart, Jr., the society continued the program initiated in 1968 with District 10 of the New York City Public Schools that enables students from DeWitt Clinton High School to combine classroom studies in biology with on-the-job training in animal departments at the zoo.

MEMBERSHIP

Gordon Cuyler, *Membership Chairman*

Membership in the society increased from 7,162 in December 1968 to 7,737 members at the end of this year. Members were invited to a special preview opening of the World of Darkness and to the Annual Meeting at the Waldorf Astoria. Almost 4,000 members attended three sessions of the meeting to see live exhibits, to hear officers of the society report on the organization's activities, and to watch films on wildlife and animal behavior. Six special tours of the zoo and aquarium also were conducted for members.



CHILDREN'S ZOO

The Children's Zoo opened on the day before Easter for its twenty-ninth year. By the time it closed on November 1, a total of 326,321 people — adults as well as children — had passed through its gates. Adults are admitted to the Children's Zoo, but only if accompanied by a youngster. There is a touch of whimsy and a hint of fairyland in this zoo within a zoo. Here youngsters can watch furry guinea pigs scurry about their turreted castle, or talk to a big black crow that talks back to them. They can board Noah's ark, visit a prairie dog town, or watch young animals at home in their nursery. For many a boy and girl, the Children's Zoo provides the first chance to pet a duck or a rabbit, and even to feed a baby llama, or to see a pigmy horse so small it might have come from Lilliput. Truly, the Children's Zoo is a children's world.





REPORT OF THE CONSERVATION COMMITTEE

THE CONSERVATION COMMITTEE

Charles W. Nichols, Jr., *Chairman*
William G. Conway, *ex officio*
Henry Clay Frick, II
Robert G. Goelet, *ex officio*
Gilbert M. Grosvenor
Peter Matthiessen
George W. Merck
Harold Palmer, *ex officio*
Laurance S. Rockefeller, *ex officio*
Landon K. Thorne, Jr.

Few members realize the extent of the society's interests in the field of conservation. In addition to the work of the zoo and the aquarium in the daily tasks of providing environmental education and caring for endangered species, staff biologists have participated vigorously in the fight to protect wild animals threatened by the fur and hide trades, especially the big cats and the crocodilians.

At the same time, the gifts of generous and concerned donors have made it possible for the society to pursue its charter interests in wildlife conservation by sponsoring a wide range of additional projects and related studies.

Programs for which either complete or partial support was provided included:

- 69-001—Publication of a monograph on mountain lion predation by Dr. Maurice G. Hornocker of the University of Idaho.
- 69-002—The Hornaday Award program of the Boy Scouts of America. This program honors boy scouts who attain high achievement in conservation activities.
- 69-003—Waterfowl research by the Delta Advisory Committee of the North American Wildlife Foundation.
- 69-004—Research on the behavior of whales by Dr. Roger Payne of the Institute for Research in Animal Behavior, and establishment of a program, entitled The Whale Fund, to marshal public support for efforts to preserve the larger species of whales.
- 69-005—Study of the behavior and ecology of siamangs in Malaya by Mr. David Chivers of Cambridge University.

- 69-006—Development of programs for the New York City Public Schools by the Council of Environmental Education Resource Agencies.
- 69-007—Re-publication of a monograph on "Prairie Dogs, Whitefaces, and Blue Grama," by Dr. Karl B. Koford of University of California, Davis.
- 69-008—Study of the ecology of elephants in Manyara Park by Mr. Iain Douglas-Hamilton of Lake Manyara National Park, Tanzania.
- 69-009—Visit by 12 officials of the Kenya National Parks system to the United States National Parks.
- 69-010—Development of Tarangire National Park in Tanzania.
- 69-011—Appointment of an Education Officer on the staff of the International Union for the Conservation of Nature, Morges, Switzerland.
- 69-012—Conference on the protection and conservation problems of northern circum-polar lands (support to the International Union for the Conservation of Nature).
- 69-013—Study by Mr. James R. Koplín of Humboldt State College of the relationship between environmental contamination by organochlorine pesticides and the reproductive performance of fish-eating birds.*
- 69-014—Study of the ecology and population dynamics of the pigeon hawk and the evaluation of the status of the species in Newfoundland. This research is being conducted by Dr. Tom Cade of the Laboratory of Ornithology, Cornell University, and Mr. Stanley Temple of Cornell University.*
- 69-015—Study of the effect of pesticides in the decline of bald eagles and golden eagles. The project is being conducted by Dr. Alexander Sprunt and Dr. Hueghey of Colorado State University for the National Audubon Society.*
- 69-016—Activities of the Rachel Carson Fund in Defense of the Environment (National Audubon Society).*
- 69-017—Ecological and behavioral study of the vicuña in Peru (in conjunction with the Conservation Foundation).*
- 69-018—Study by Dr. A. E. Dammann of the Virgin Island Ecology Research Station to attempt to insure survival of the endangered Virgin Island grand iguana.*
- 69-019—Ecological study of the Bermuda cahow by Mr. David Wingate of the Bermuda Department of Agriculture and Fisheries.
- 69-020—Survey leading to the establishment of marine parks in East Africa by Dr. Carleton Ray of the Johns Hopkins University.*
- 69-021—Establishment of the Trinidad School for Conservation Wardens and protection of the Tamana bat cave in Trinidad, W. I.
- 69-022—Protection of the endangered Texas blind salamander. The last living specimens inhabit a single cave in Texas.*
- 69-023—Activities at the Barro Colorado Island research station, Canal Zone (Smithsonian Institution).
- 69-024—Study of the population and behavior of the Komodo monitor on Komodo Island, Indonesia, by Dr. Walter Auffenberg and Dr. F. Wayne King.
- 69-025—Study and promotion of wildlife parks in Patagonia, Argentina, by Mr. Robert G. Goelet and Mr. William G. Conway.

*The Charlotte Ordway Fondaras
Wildlife Protection Fund

EXECUTIVE VICE-PRESIDENT
ROBERT G. GOELET IN
PATAGONIA



FINANCIAL STATEMENTS

Exhibit A

BALANCE SHEET

December 31, 1969

| | <u>Current funds</u> | | <u>Land, buildings, animals and equipment funds</u> | | |
|---|----------------------|----------------|---|--|--|
| | General | Restricted | Unexpended | Equity in land, buildings, animals and equipment | Endowment funds and funds functioning as endowment |
| Assets: | | | | | |
| Cash | \$ 914,121 | 20,000 | - | - | 26,354 |
| Accounts receivable | 598,035 | - | - | - | - |
| Grants receivable - U. S. Government | - | 293,497 | - | - | - |
| Note receivable | - | - | - | - | 45,084 |
| Inventories, at lower of cost or market | 28,021 | 84,710 | - | - | - |
| Prepaid expenses and deferred charges | 23,127 | - | - | - | - |
| Investments (quoted market, \$12,932,000) - (note 2) | - | - | - | - | 12,488,605 |
| Other | - | 28,387 | - | - | - |
| Due from other funds | - | 270,011 | 1,250,205 | - | - |
| Equipment - visitor facilities, at cost (net of accumulated depreciation of \$415,483) - (note 3) | - | - | - | 312,186 | - |
| Other land, buildings, animals and equipment (note 1) | - | - | - | 5 | - |
| Total assets | <u>\$ 1,563,304</u> | <u>696,605</u> | <u>1,250,205</u> | <u>312,191</u> | <u>12,560,043</u> |
| Liabilities and fund balances: | | | | | |
| Accounts payable and accrued expenses | 708,170 | 9,410 | 71,577 | - | - |
| Due to other funds | 1,124,857 | - | - | - | 395,359 |
| Fund balances (deficit): | | | | | |
| Unappropriated general fund | (269,723) | - | - | - | - |
| Restricted | - | 687,195 | - | - | - |
| Unexpended land, buildings, animals and equipment | - | - | 1,178,628 | - | - |
| Investment in land, buildings, animals and equipment | - | - | - | 312,191 | - |
| Endowment | - | - | - | - | 2,422,101 |
| Funds functioning as endowment | - | - | - | - | 9,742,583 |
| Total liabilities and fund balances | <u>\$ 1,563,304</u> | <u>696,605</u> | <u>1,250,205</u> | <u>312,191</u> | <u>12,560,043</u> |

See accompanying notes to financial statements.

SUMMARY OF FINANCIAL ACTIVITIES

Year ended December 31, 1969

Revenue:

| | |
|---|------------------|
| Fees and grants from governmental units | \$ 2,081,365 |
| Program service fees and grants | 790,895 |
| Income from visitor facilities (after deducting \$1,362,432 of directly related costs and expenses) | 549,031 |
| Investment income, gains or losses | 678,734 |
| Miscellaneous (including membership dues of \$151,723) | 165,230 |
| Total revenue | <u>4,265,255</u> |

Support from the public - contributions

1,722,119

Total revenue and support

5,987,374

Deduct revenue and support limited by donors:

| | | |
|---|------------------|-----------|
| Currently expendable, but only as specified by donor (Exhibit C) | \$ 3,016,636 | |
| Construction and acquisition of land, buildings, animals and equipment (Exhibit C) | 1,231,713 | |
| Total limited revenue and support | <u>4,248,349</u> | |
| Amount available to finance current general expenditures | | 1,739,025 |

Expenditures:

| | |
|---|------------------|
| Program services | 3,760,250 |
| Supporting services | 405,743 |
| Major acquisitions of land, buildings, animals and equipment | <u>2,512,143</u> |
| Total expenditures | 6,678,136 |

Deduct expenditures financed by special funds:

| | | |
|---|------------------|------------------|
| Current restricted funds (Exhibit C) | \$ 2,624,735 | |
| Unexpended land, buildings, animals and equipment funds (Exhibit C) | <u>2,520,396</u> | <u>5,145,131</u> |
| Expenditures financed by current general revenue and support | | 1,533,005 |
| Excess of current general revenue of support over related expenditures | | 206,020 |

Deduct transfers:

| | | |
|--|----------------|-------------------|
| To unexpended land, buildings, animals and equipment funds - net income from aquarium's visitor facilities | 115,468 | |
| To funds functioning as endowment - contributions designated by Trustees for general development | <u>362,681</u> | 478,149 |
| Decrease in unappropriated current general fund | | <u>\$ 272,129</u> |

See accompanying notes to financial statements.

STATEMENT OF CHANGES IN FUND BALANCES

Year ended December 31, 1969

| | Current Funds | | Land, buildings, animals and equipment funds | Equity in land, buildings, animals and equipment | Endowment funds and funds functioning as endowment | Funds functioning as endowment |
|---|---------------|------------|--|--|--|--------------------------------------|
| | General | Restricted | Unexpended | | Endowment | |
| Balance at beginning of year | \$ 2,406 | 856,150 | 1,891,280 | 339,392 | 2,388,085 | 9,257,981 |
| Additions: | | | | | | |
| Current revenue, expendable only as specified by agreement | - | 3,016,636 | - | - | - | - |
| Contributions and appropriations for unexpended land, buildings, animals and equipment fund | - | - | 1,198,000 | - | - | - |
| Investment income, gains or losses | - | - | 28,455 | - | 34,016 | 131,921 |
| Equipment acquisitions | - | - | 5,258 | - | - | - |
| Other | - | - | - | 7,053 | - | - |
| Total additions | - | 3,016,636 | 1,231,713 | 7,053 | 34,016 | 131,921 |
| Deductions: | | | | | | |
| Decrease in unappropriated current general funds (Exhibit B) | 272,129 | - | - | - | - | - |
| To finance expenditures of current general funds | - | 2,624,735 | - | - | - | - |
| Indirect costs recovered on research grants | - | 106,492 | - | - | - | - |
| Amounts expended for land, buildings, animals and equipment | - | - | 2,520,396 | - | - | - |
| Provision for depreciation | - | - | - | 34,254 | - | - |
| Other | - | 3,801 | - | - | - | - |
| | 272,129 | 2,735,028 | 2,520,396 | 34,254 | - | - |
| Transfers between funds | * | (450,563) | 576,031 | - | - | 352,681 |
| Balance (deficit) at end of year | \$ (269,723) | 687,195 | 1,178,628 | 312,191 | 2,422,101 | 9,742,582 |

*Transfers from current general fund are reported on Exhibit B.
See accompanying notes to financial statements.

NOTES TO FINANCIAL STATEMENTS
December 31, 1969

- (1) Unrestricted and restricted pledges receivable of approximately \$193,000 and \$820,000, respectively, have not been recorded in the accompanying statements.
Expenditures for land, buildings, animals and equipment have been charges to operations and to unexpended land, buildings, animals and equipment funds. However, only the cost of equipment of the visitor facilities has been capitalized in the land, buildings, animals and equipment fund. Other such assets including, but not limited to, the following are recorded in this fund at the nominal value of \$5.
 - National collection of heads and horns, art gallery,
 - library and sundry items
 - Collection of living animals
 - Coney Island real estate
 - Land and buildings made available by the City of New York
- (2) Investments are stated at cost or, if acquired by gift, at fair market value at dates of acquisition.
- (3) Equipment of the visitor facilities in use at December 31, 1969 is being written off over its estimated useful life on a straight-line basis.
- (4) The New York Zoological Society and the City of New York have agreed to construct an aquarium, as funds become available, at an estimated total cost (to be shared equally) of \$7,100,000, of which the initial state (of approximately \$1,550,000) was completed May 31, 1957. The Society is also committed to make payments totaling approximately \$1,700,000 for construction and alteration of certain exhibits.
- (5) There are two pension plans covering substantially all of the Society's full-time employees. The total pension expense for 1969 was \$72,961. The Society's policy is to fund pension cost accrued, and no unfunded past service cost or unfunded vested benefits existed at December 31, 1969. The assets of the pension fund, which approximated \$3,000,000 at December 31, 1969, are not recorded in the accompanying financial statements.

The Board of Trustees
New York Zoological Society:

We have examined the balance sheet of New York Zoological Society as of December 31, 1969 and the related summary of financial activities and statement of changes in fund balances for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, except for the valuation of certain fixed assets and the omission of pledges receivable as described in note 1 to the financial statements, the accompanying financial statements present fairly the financial position of New York Zoological Society at December 31, 1969 and the results of its operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Peat, Marwick, Mitchell & Co.

March 20, 1970

THE PENSION FUND
(Founded by Andrew Carnegie)

Statement of Cash Transactions

Year ended December 31, 1969

| | | |
|---|--|---------------|
| Balance at beginning of year: | | |
| Investments (quoted market value \$3,182,515) | | \$ 2,963,926 |
| Uninvested balance of cash | | <u>36,215</u> |
| | | 3,000,141 |

Receipts:

Income from investments:

| | | |
|-----------|---------------|--|
| Interest | \$ 89,158 | |
| Dividends | <u>46,658</u> | |
| | 135,816 | |

| | | |
|--------------------------------------|--------------|----------------|
| Contributions by employees - regular | <u>4,045</u> | <u>139,861</u> |
| | | 3,140,002 |

Expenditures:

| | | |
|------------------------------------|--------------|----------------|
| Refunds on account of resignations | 16,029 | |
| Pension disbursements | 92,427 | |
| Death benefit disbursements | 5,073 | |
| Custodian fees | 2,280 | |
| Actuarial fees | <u>2,900</u> | <u>118,709</u> |
| | | 3,021,293 |

| | | |
|-------------------------------------|--|---------------|
| Net gain on investment transactions | | <u>74,791</u> |
|-------------------------------------|--|---------------|

| | Value | | |
|-------------------------------|---------------------|----------------|---------------------|
| | Quoted market | Cost | |
| Balance at end of year: | | | |
| Investments: | | | |
| Bonds | \$ 1,953,370 | 2,414,293 | |
| Preferred stocks | 33,925 | 66,200 | |
| Common stocks | 796,231 | <u>493,553</u> | |
| | <u>\$ 2,783,526</u> | | 2,974,046 |
| Uninvested balance of cash | | | <u>122,038</u> |
| | | | <u>\$ 3,096,084</u> |

The Board of Trustees
New York Zoological Society:

We have examined the statement of cash transactions of The Pension Fund (founded by Andrew Carnegie) of The New York Zoological Society for the year ended December 31, 1969 and the supporting schedule of investments as of December 31, 1969. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the accompany statement of cash transactions for the year ended December 31, 1969, together with the aforementioned supporting schedule, presents fairly the results of recorded cash transactions of The Pension Fund of The New York Zoological Society for the year then ended and the assets of the Fund at December 31, 1969, on a basis consistent with that of the preceding year.

Peat, Marwick, Mitchell & Co.

March 16, 1970

The Board of Trustees
New York Zoological Society:

We have examined the statement of the Principal Fund of the Permanent Wild Life Protection Fund for the year ended December 31, 1969, set forth below:

| | | |
|--|--------------|-------------------|
| Cash | | \$ 9,715 |
| Amount due from New York Zoological Society | | 20,019 |
| Investments, at cost (quoted market value \$171,200) | | <u>198,149</u> |
| Principal Fund: | | |
| Balance at beginning of year | \$ 232,421 | |
| Deduct net loss on disposal of investments | <u>4,538</u> | |
| Balance at end of year | | <u>\$ 227,883</u> |

Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In accordance with the agreement establishing this Fund, the income from the investments of \$10,950 was paid over to the New York Zoological Society to be used for the specific purposes set forth in such agreement.

In our opinion, the above statement of the Principal Fund presents fairly the financial position of the Permanent Wild Life Protection Fund at December 31, 1969, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year. The supplementary data included in Schedule 1 have been subjected to the same auditing procedures and, in our opinion, are stated fairly in all material respects when considered in conjunction with the statement of the Principal Fund.

Peat, Marwick, Mitchell & Co.

March 6, 1970

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